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PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

SAKAI et al.

Group Art Unit: 2823

Application No.: 10/714,644

Examiner: T. Dang

Filed: November 18, 2003

Docket No.: 117787

For: METHOD FOR FABRICATING A SIGE FILM, SUBSTRATE FOR EPITAXIAL GROWTH AND MULTILAYERED STRUCTURE

REQUEST FOR RECONSIDERATION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In reply to the September 22, 2004 Office Action, reconsideration of the application is respectfully requested.

Claims 1-4 and 8-11 stand rejected under 35 U.S.C. §102(b) over U.S. Patent No. 6,039,803 to Fitzgerald et al. This rejection is respectfully traversed.

Independent claims 1 and 8 recite, *inter alia*, a method for fabricating a SiGe film, a substrate for epitaxial growth and a multilayered structure comprising 90 degree dislocations "at least at a region of said SiGe film near the Si substrate." Applicants respectfully submit that Fitzgerald et al. does not disclose, teach or suggest a method of providing a multilayered material wherein 90 degree dislocations are formed near the Si substrate, as recited in independent claims 1 and 8.

The Office Action alleged that Fitzgerald et al. discloses, at col. 13 lines 2-5, "an orthogonal dislocation grid made up of dislocations of the kind $\frac{1}{2}\langle 110 \rangle$ and $\frac{1}{2}\langle \bar{1}10 \rangle$,

reactions such as equations (1) and (2) can lead to a hexagonal network as observed in Fig. 11B."

More specifically, however, Fitzgerald et al. discloses, in Figs. 1A, 11A, 11B and at col. 11 col. 63 through col. 12 line 9, a multilayered structure of Ge layer/Ge_x-Si_{1-x} layer (Ge being graded)/Si layer, the hexagonal network being formed in the Ge graded layer. The Ge graded region, formed so as to relax the difference in lattice constant between the Si substrate and the Ge layer, has the Si-rich region of the Ge graded layer formed near the Si substrate and the Ge-rich region of the Ge graded layer formed near the Ge layer. Fitzgerald et al. specifically discloses, at col. 14 lines 4-11, the presence of "a novel hexagonal dislocation network consisting of edge dislocations in the Ge-rich regions of the graded structure" (emphasis added).

Thus, the hexagonal dislocation network disclosed by Fitzgerald et al. is formed near the Ge layer, not the Si substrate. In contrast, claims 1 and 8 recite the 90° dislocations as formed "at least at a region of said SiGe film near said Si substrate." Therefore, Applicants respectfully submit that Fitzgerald et al. does not disclose the 90° dislocations recited in claims 1 and 8.

Furthermore, not only does Fitzgerald et al. fail to disclose, teach or suggest forming the hexagonal dislocation network near the Si substrate, Fitzgerald et al. specifically *teaches away* from the implementation of a hexagonal dislocation network consisting of edge dislocations within the Si-rich region of the Ge graded layer, which is adjacent to the Si substrate. Fitzgerald et al. teaches at col. 13 lines 11-17, that a low energy hexagonal network of dislocations does not form in regions of high Si content in the graded structure because the difference in the growth temperature and the melting point of the alloy is large, resulting in low atomic mobility, thereby limiting dislocations due to lack of dislocation climb.

Moreover, such teachings of Fitzgerald et al. cannot reasonably be considered to enable a hexagonal dislocation network consisting of edge dislocations near the Si substrate. Non-enabled inventions are not considered prior art. For example, in *In re Wilder* 166 USPQ 545 (C.C.P.A. 1970), the CCPA stated that a prior art reference "may yet be held not to legally anticipate the claimed subject matter if it is found not to be sufficiently enabling, or in other words, it does not place the subject matter of the claims within the possession of the public." *Id.*, at 548.

Therefore, it is respectfully submitted that the Office Action fails to establish a prima facie case of anticipation, having failed to provide a single reference that teaches or enables each of the claimed elements expressly or inherently as interpreted by one of ordinary skill in the art. Specifically, the Office Action fails to establish that Fitzgerald et al. placed a hexagonal dislocation network consisting of edge dislocations near the Si substrate within the possession of the public.

Applicants respectfully submit that at least for these reasons, claims 1 and 8 are patentable over Fitzgerald et al. Claims 3-4 and 9-11 depend from claims 1 and 8, respectively, and are likewise patentable over Fitzgerald et al. at least for their dependence on an allowable base claim, as well as for the additional features they recite. Accordingly, withdrawal of the rejection under 35 U.S.C. §102(b) over Fitzgerald et al. is respectfully requested.

Claims 5 and 12 stand rejected under 35 U.S.C. §103(a) over Fitzgerald et al. Claims 6, 7, 13 and 14 stand rejected under 35 U.S.C. §103(a) over Fitzgerald et al. in view of U.S. Patent No. 5,188,778 to Takasaki. Claim 15 stands rejected under 35 U.S.C. §103(a) over Fitzgerald et al. in view of U.S. Patent No. 6,525,338 to Mizushima et al.

The Office Action asserts that the formation of a GaAs layer between the Si substrate and the SiGe layer would have been obvious to one of ordinary skill in the art.

The Office Action relies on Mizushima et al. to disclose a semiconductor device in which a strained silicon layer formed on a relaxed SiGe layer is used for the channel of the device.

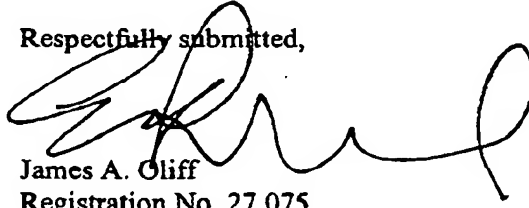
It is respectfully submitted that, as described above, Fitzgerald et al. fails to disclose, teach or suggest all of the features of claims 1 and 8. Neither Takasaki nor Mizushima et al. makes up for the deficiencies of Fitzgerald et al. set forth above.

Accordingly, it is respectfully submitted that claims 5-7 and 12-15 are patentable over Fitzgerald et al. at least for their dependence on an allowable base claim, as well as for any additional feature they recite. Accordingly, withdrawal of these rejections is respectfully requested.

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-15 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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